Long-Term Surveillance and Maintenance Program

Long-Term Surveillance Plan for the Piqua Nuclear Power Facility Piqua, Ohio

April 1998
(minor revisions November 1999)

Prepared for
U.S. Department of Energy
Albuquerque Operations Office
Grand Junction Office

Prepared by
MACTEC Environmental Restoration Services, LLC
Grand Junction, Colorado

Project Number LTS-111-0027-00-000
Document Number S0007600

Work Performed Under DOE Contract Number DE-AC13-96GJ87335
Task Order Number MAC98-06

This page intentionally blank

Contents

Page

Figures

Appendix

1.0 Introduction

1.1 Purpose

This Long-Term Surveillance Plan (LTSP) is a technical plan that explains how the U.S. Department of Energy (DOE) will fulfill its responsibilities as the long-term custodian of the Piqua Nuclear Power Facility (PNPF) at Piqua, Ohio.

1.2 Legal and Regulatory Requirements

In 1968 the DOE, as successor to the AEC, entered into a 50-year contract/lease agreement with the City of Piqua. Under terms of this agreement, the DOE leases the Decontamination and Decommissioning (D&D) facilities to the City of Piqua at no cost. The facility currently houses the city's electric company and associated inventory of supplies and equipment. By virtue of its role as facility occupant, the City is effectively institutionally controlling the PNPF.

The Agreement (Agreement 1968) with the City of Piqua, designated as Contract No. AT(11-1)-1798, specifies the responsibilities of both the DOE and the City. The DOE is responsible for inspections and assurances that no unsafe radiological conditions exist, until such time as the radioactivity within the isolated areas decays to 10 CFR 20 levels or below or is safely removable.

The DOE also assures the City that the Nuclear Hazards Indemnity Clause contained in Contract No. AT(11-1)-652 between the Government and the City survives the termination of the contract. The contract referred to here is the original contract with the AEC to construct and operate the reactor (Contract 1959).

The City holds certain responsibilities regarding nonnuclear aspects of the land and structures. The City also must permit the DOE free and ready access to the premises at any time. "The City shall not breach the barrier to the sealed radioactive source and it shall engage in no activities on the land in question which might contribute to a breach of such barrier, nor shall it permit any such activities by others" (Agreement 1968).

1.3 Role of the Department of Energy

In 1988, the DOE designated the Grand Junction Office (GJO) to be the program office for long-term surveillance and maintenance of all DOE remedial action project disposal sites, as well as other sites as assigned, and to establish a common office for the security, surveillance, monitoring, and maintenance of these sites. The DOE established the Long-Term Surveillance and Maintenance (LTSM) Program at the GJO to carry out this responsibility.

The LTSM Program is responsible for the preparation, revision, and implementation of this LTSP, which includes site inspection and monitoring. The LTSM Program is also responsible for reporting the results of site inspections and monitoring, and for maintaining site records.

1.4 Points of Contact

The individual point of contact at the GJO is:

Russel W. Edge, Project Manager
U. S. Department of Energy, Grand Junction Office
2597 B3/4 Road
Grand Junction, Colorado 81503
(970) 248-6037

The individual point of contact at the City of Piqua is:

William J. Sommer, Power Systems Director
Municipal Power System
123 Bridge Street
Piqua, Ohio 45356
(513) 778-2077

2.0 Site Background Information

2.1 Description of Site Area

2.1.1 Location and Property Ownership

The PNPF is located in southwestern Ohio (north of Dayton) on the east bank of the Great Miami River in the southeastern portion of the town of Piqua, Ohio (Figure 1). It is situated on DOE-owned land about 900 feet southeast of the Piqua Municipal Power Station and about 150 feet north of the City Sewage Treatment Plant. The north and east sides of the decommissioned facility are bounded by a limestone quarry owned by the Armco Steel Company. The decommissioned PNPF is approximately 120 feet from the Great Miami River (DOE 1993).

Title to the land on which the reactor and auxiliary buildings were located has been transferred to the DOE. The DOE leases the land and facilities back to the City. This arrangement will continue until the radioactive materials left in place decay to reasonable levels. At that time, the DOE will reconvey the title to the land and facilities to the City (DOE 1993). A legal description of the property can be found in Appendix A of this document.

Directions and mileage to the site are as follows:

From Dayton, Ohio, travel north on I-75.

North of Troy, take County Road Exit 25A and turn left from exit ramp to go north toward Piqua.

The power plant will be on the left. Drive past the power plant to second light at Garnsey Street.

Turn right on to Garnsey Street and travel across bridge to other side of the river. At first lane, turn to right. Terrain resembles Piqua mineral quarry, and the dome-shaped building is visible.

2.1.2 Topography and Surface Hydrology

The PNPF is located near the center of the Great Miami River Valley, a nearly flat plain 8 to 19 miles across and 50 to 100 feet below the general elevation of the terrain adjacent to the Valley (DOE 1993). The above grade portion of the PNPF is approximately 866 feet above sea level.

The Great Miami River originates 40 miles northeast of Piqua and flows south around the eastern edge of Piqua and to the Ohio River, approximately 90 miles to the south of Piqua. Flow in this river originates from three major and two minor subdrainage systems. Prior to 1921, considerable flooding occurred throughout the Great Miami River basin. Since construction of retarding basins in 1921, flooding on the river has been greatly reduced (DOE 1993).

One of the Great Miami River retarding dams and basins was established four miles upstream of Piqua. This dam, together with levees and river channel improvements at Piqua, was designed to

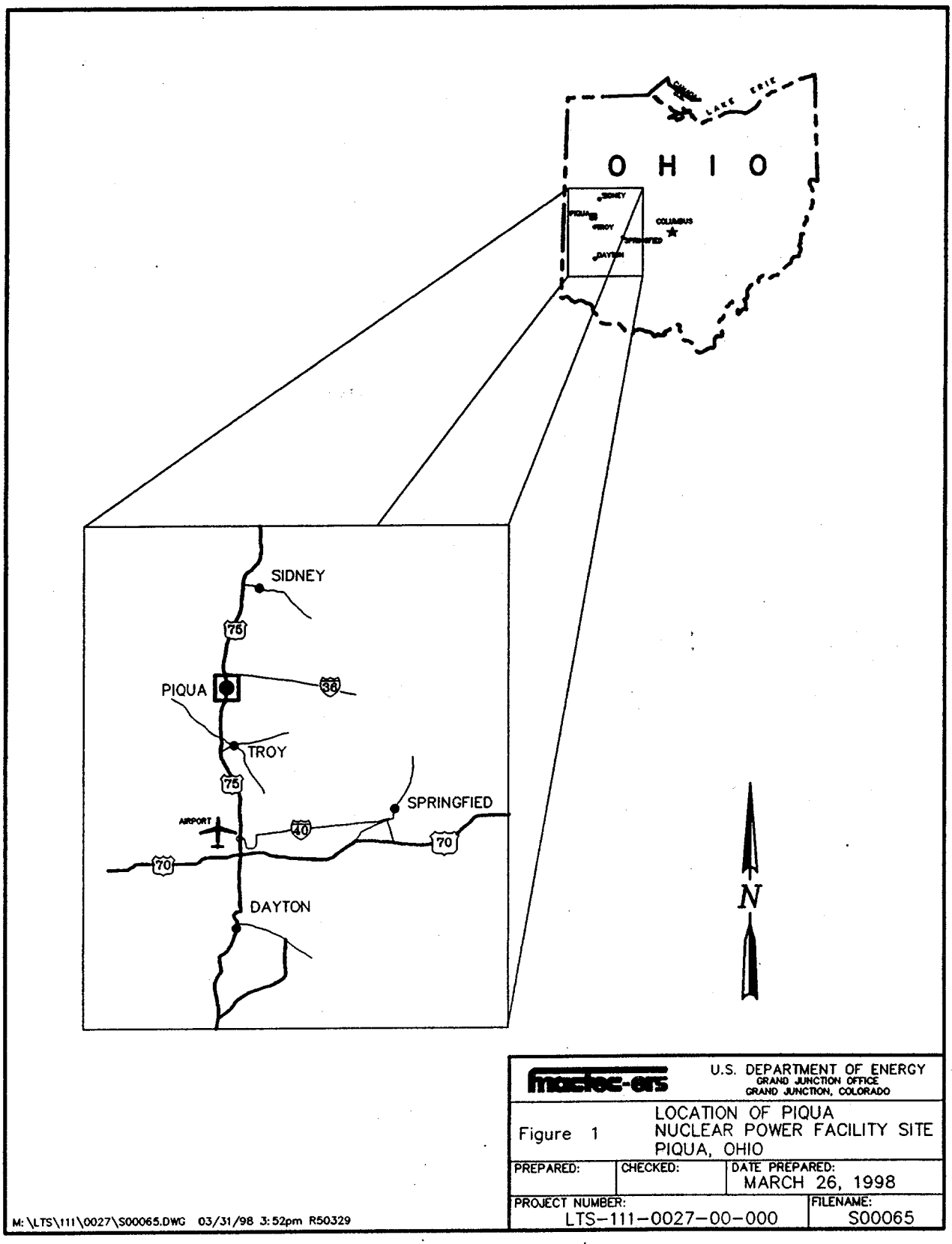

Figure 1. Location of Piqua Nuclear Power Facility Site

permit a maximum river flow at Piqua of 80,000 cubic feet per second (cfs). The elevation of the river near the PNPF during a flow of this magnitude will not exceed 864.5 feet above sea level. The highest river flow at Piqua since the construction of the dams was 22,000 cfs in 1929 and 1933, and the elevation of the river at the PNPF site during these flows was 857.4 feet above sea level (DOE 1993). This is 8.6 feet below the main floor level of the PNPF.

2.1.3 Physiography and Hydrogeology

Southwest Ohio is characterized by gently rolling glacial till plains. Geologic profiles at the PNPF site indicate that alluvial soil and rock material extend from the surface to a depth of approximately 8 feet; Brassfield limestone underlies the uppermost soil and rock layer and extends to a depth of 30 feet; blue weathered shale and fossiliferous limestone of the Richmond formation underlie the Brassfield formation to a depth of 50 feet. A hard impervious bedrock exists below 50 feet (DOE 1993).

Ground water in the area of the PNPF occurs mostly in the blue weathered shale and most wells in the region are drilled to this strata. Movement of ground water is generally toward areas of natural discharge, such as surface streams. Around the PNPF, ground-water flow is dominated by water levels in the Great Miami River (DOE 1993).

2.1.4 Climate

Piqua is characterized by continental-type climate with about 35 inches of rain per year. High relative humidities prevail much of the time. There are about 130 days per year with rainfall. The average tornado frequency for the state of Ohio is 3.2 per year. The average seasonal temperatures range from 31°F during winter to 73°F in the summer. The high and low temperature extremes were 106°F and –16°F (Atomics International 1968).

2.2 Site History

The PNPF contained a 45.5 megawatt (thermal) organically cooled and moderated reactor. It was built and operated as a demonstration project by the U. S. Atomic Energy Commission (AEC) between 1963 and 1966. The PNPF was owned by the AEC and operated by the City of Piqua, Ohio, under contract to AEC. During its brief period of operation, the PNPF experienced numerous technical difficulties and operation was discontinued by the AEC in 1966. In December 1967, the AEC decided to terminate its contract with the City of Piqua for the operation and maintenance of the facility. A 1968 agreement (Agreement 1968) between the AEC and the City of Piqua identified specific items to be accomplished in dismantling and decommissioning the PNPF (DOE 1993).

The City of Piqua accepted responsibility for the on-site deactivation activities and agreed that the reactor vessel and other radioactive parts of the reactor complex would remain in place. The facility was dismantled and placed in a safe condition for retirement between 1967 and February 1969, and decommissioned by the AEC in 1969. PNPF was included in the DOE Surplus Facilities Management Program (SFMP) for safe caretaking of retired nuclear facilities that were used to support energy research and the development of nuclear power. The SFMP has been transferred to the Office of Environmental Restoration and Waste Management, which is

responsible for the continuation of the environmental radiological monitoring program at the PNPF that was established in 1969 (DOE 1993).

2.3 Stabilization/Isolation Approach

The PNPF was decommissioned, dismantled, and retired between 1967 and 1969.

The reactor fuel and coolant and most of the radioactive materials were physically removed from the site. Contaminated piping and equipment inside the reactor building were removed or decontaminated. The reactor vessel, the concrete shielding, and fixed components within the reactor vessel were left in place. The main floor of the reactor building was covered by a waterproof material and a layer of concrete to render the areas containing the radioactive material inaccessible to water and personnel (DOE 1993).

Currently, the PNPF consists of the reactor building and a connecting auxiliary building. The reactor building is a vertical cylindrical steel containment structure housing the reactor vessel, steam generating equipment, and other components of the reactor heat transfer system. An auxiliary building houses supporting auxiliary equipment, such as the heating and ventilation system. The above-ground facilities are presently used by the City for offices, meeting rooms, and storage areas. The below-ground portion of the facility, extending from the surface to a depth of 100 feet, consists of a massive, reinforced concrete structure containing the retired reactor complex (DOE 1993).

The reactor vessel is contained within both a cavity liner and an 8-foot thick concrete biological shield. The radioactive materials remaining on site are integral parts of the reactor structure (i.e., contaminated steel and concrete), not surficial contamination. The reactor vessel is housed within the below-grade reinforced concrete structure that originally served as the PNPF containment building. Thickness of concrete, steel, and other materials in the vicinity of the stored radioactive materials were dictated primarily by shielding considerations for the operational plant. Because of the original design considerations, the structure can be expected to retain its integrity for an indefinite period of time (DOE 1993). The minimum design life objective for the various seals, supplementary closures, and weatherproofing measures, installed during the dismantling of the facility is 100 years.

2.4 Site Maps and Drawings

Two sealed containers or “time capsules” containing detailed information describing the radioactive materials and related structures for the PNPF are located at the facility. One of the sealed containers is located in a wall behind a metal plaque bearing the following inscription:

PIQUA NUCLEAR POWER FACILITY

-NOTICE-

Behind this plaque is a metal box containing detailed information concerning the reactor complex structure and contents. This box is not to be opened without the permission of the United States Government.

-United States Atomic Energy Commission-

-1969-

Specific locations of the sealed containers are included in the Miami County deed book. A copy of the deed book information is included in Appendix A of this document.

Figures 2 through 7 are plan views showing the various levels of the reactor and auxiliary building. These figures can be used for indicating radiological survey locations and survey results of the annual monitoring events.

2.5 Ground-Water Conditions

There is no record of ground-water contamination associated with this facility. There is no ground-water monitoring program now nor is there expected to be in the future.

This page intentionally blank

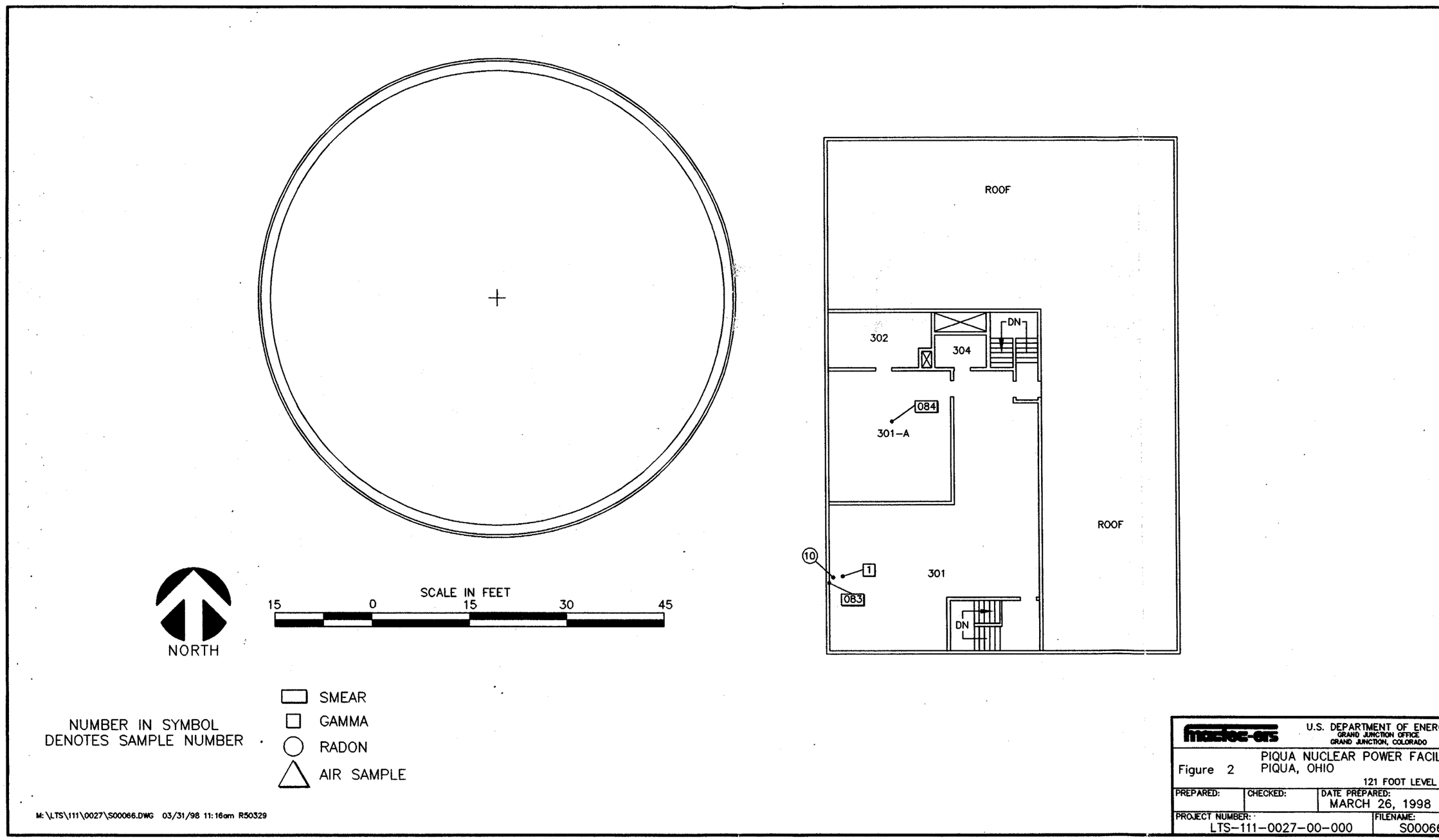

Figure 2. Piqua Nuclear Power Facility

This page intentionally blank

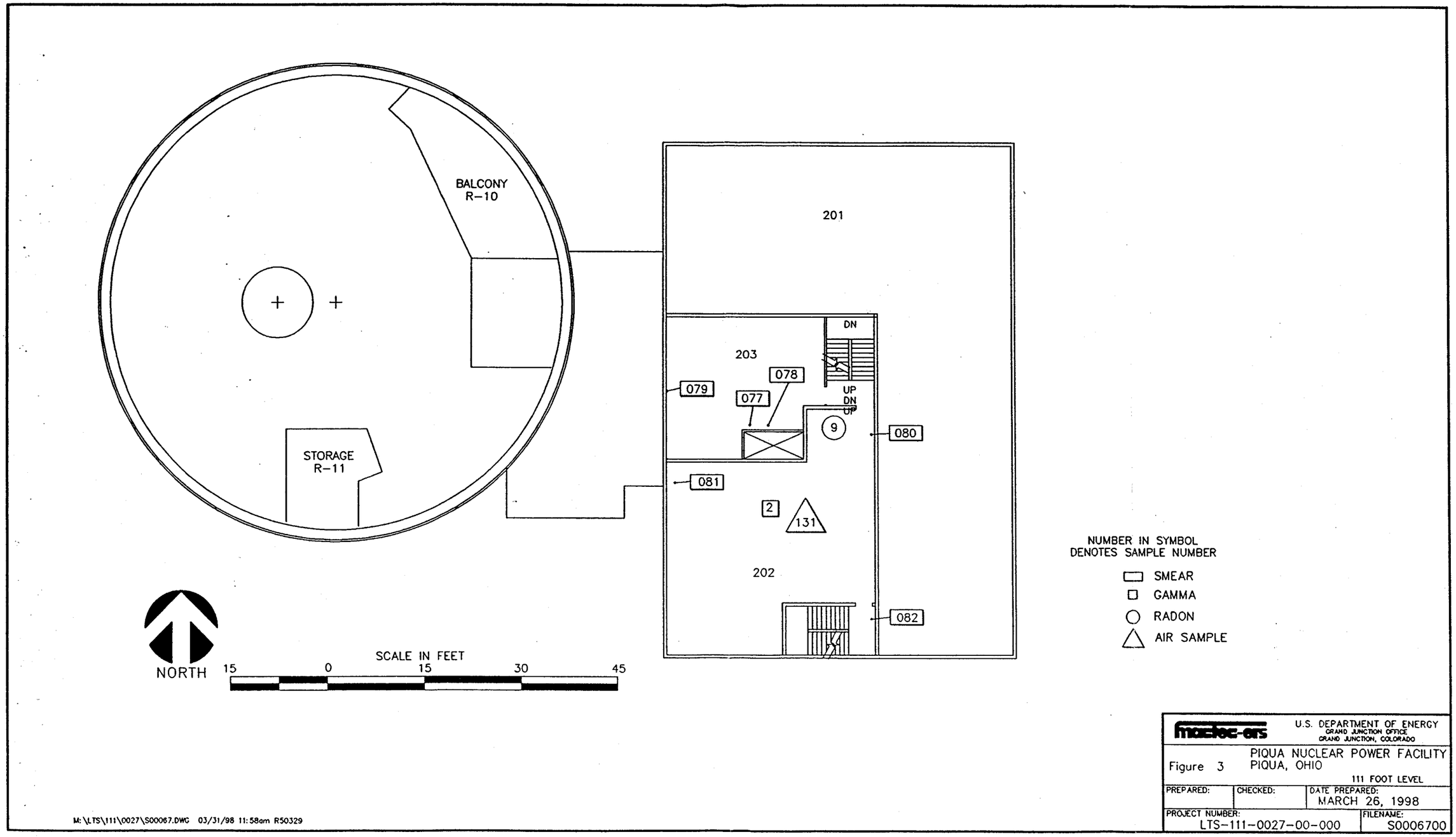

Figure 3. Piqua Nuclear Power Facility

This page intentionally blank

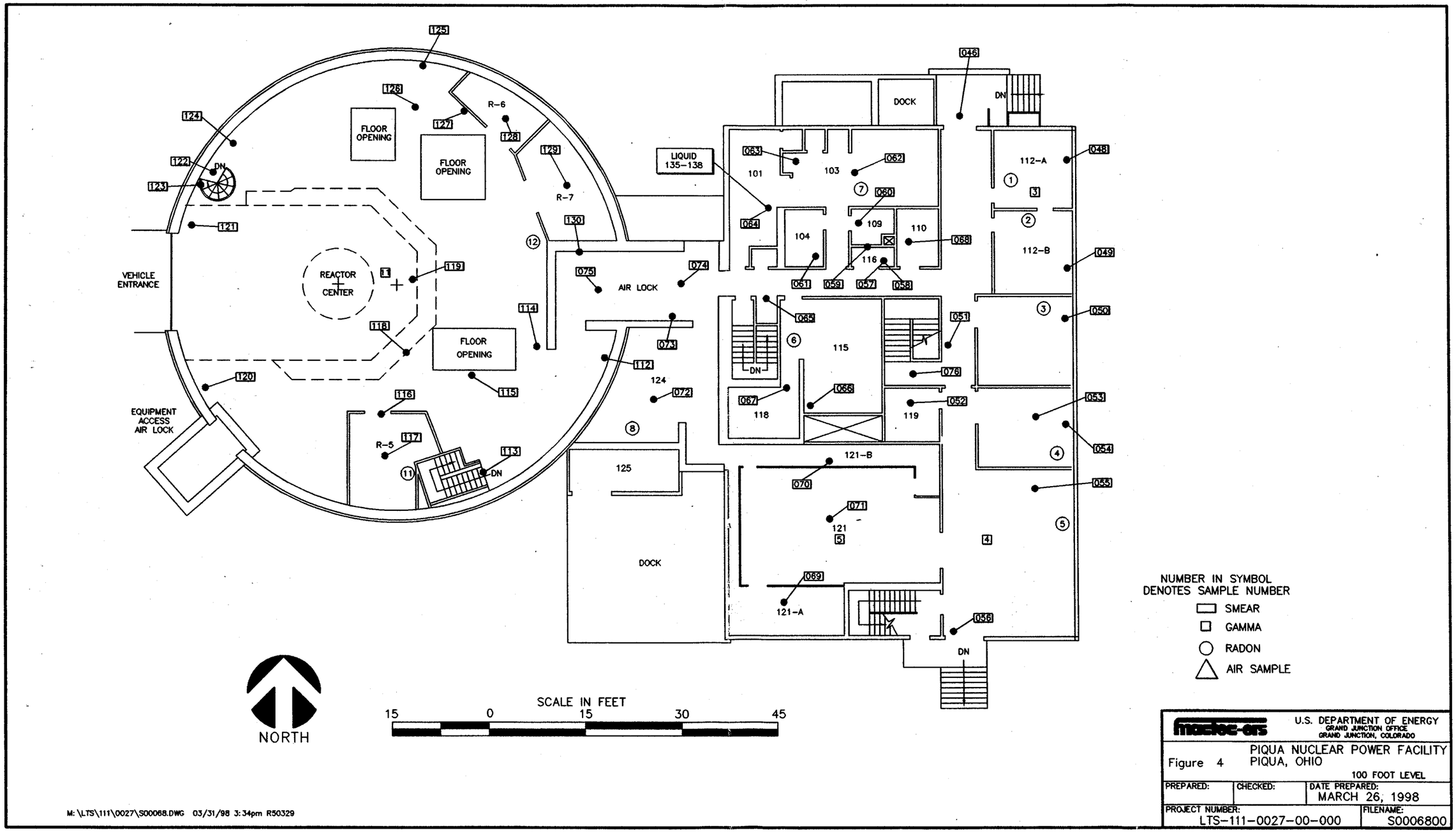

Figure 4. Piqua Nuclear Power Facility

This page intentionally blank

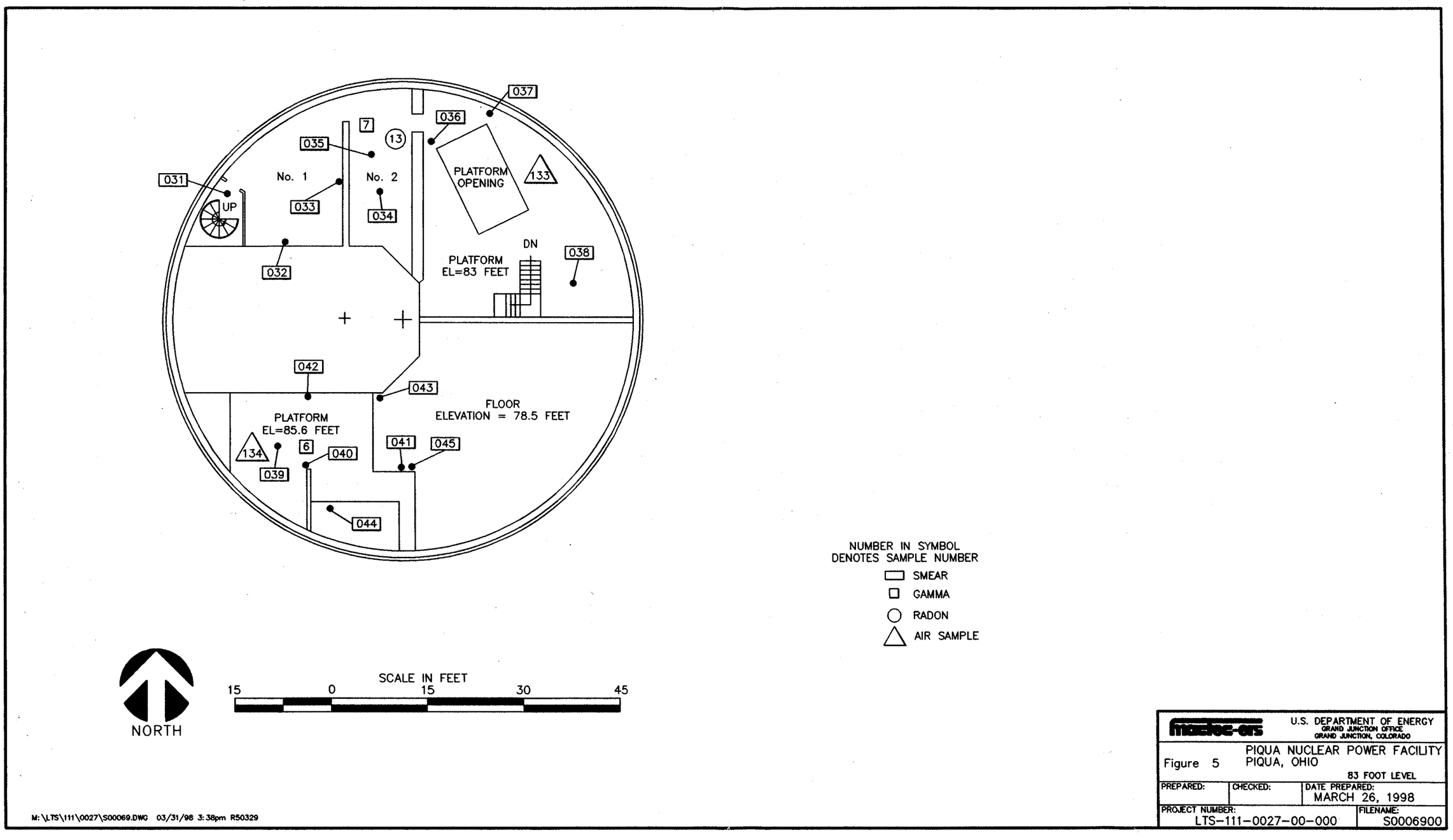

Figure 5. Piqua Nuclear Power Facility

This page intentionally blank

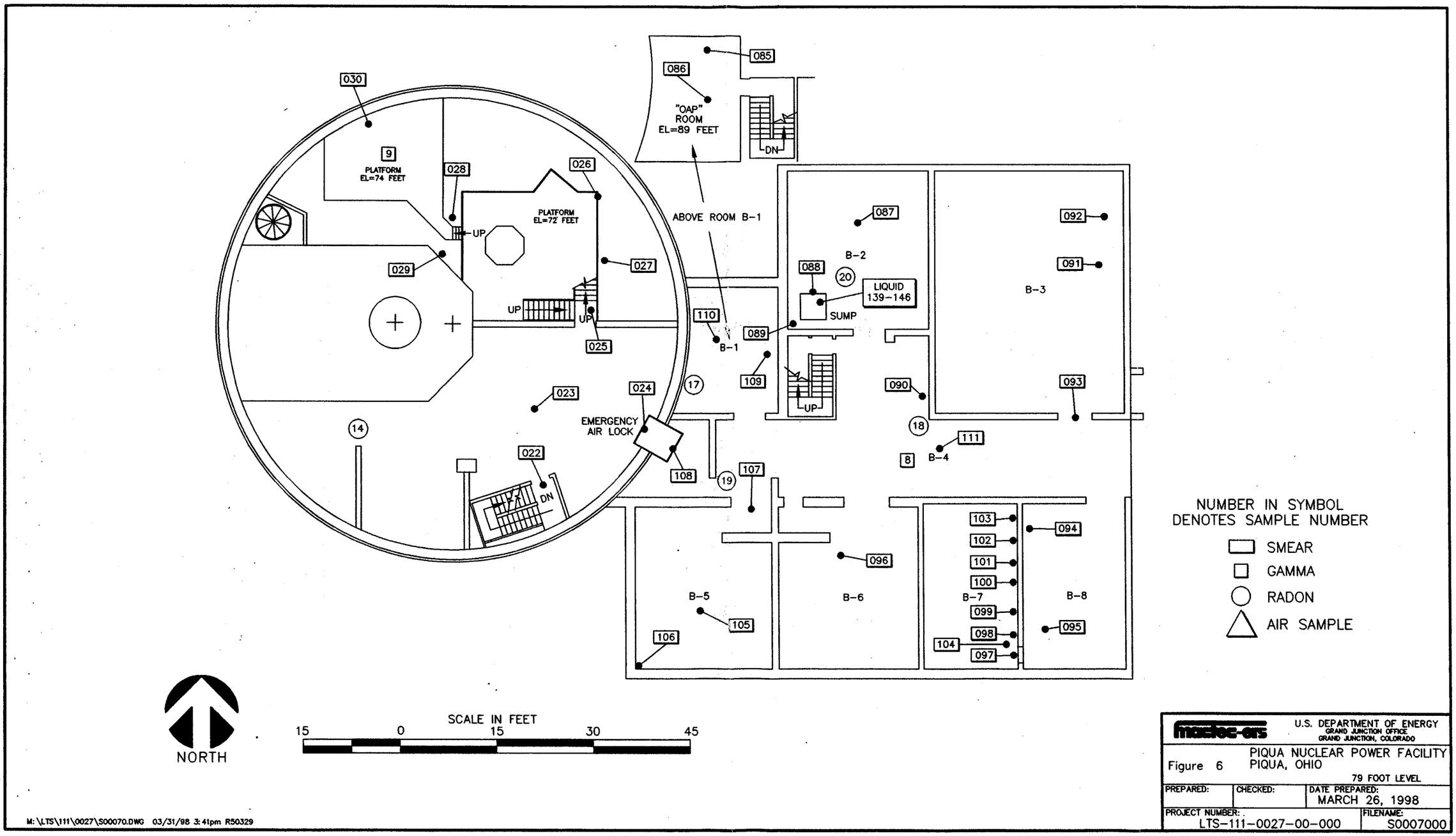

Figure 6. Piqua Nuclear Power Facility

This page intentionally blank

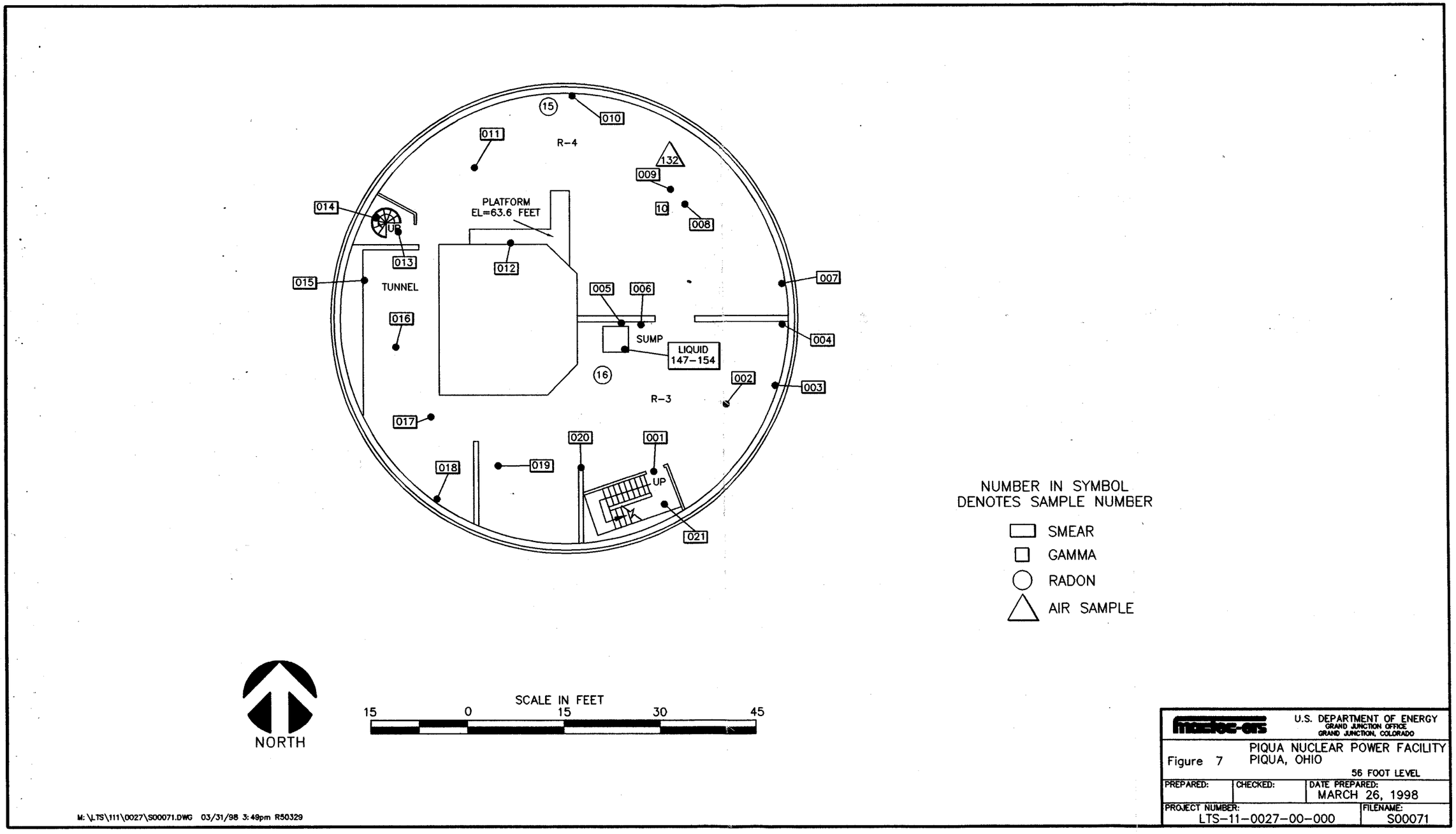

Figure 7. Piqua Nuclear Power Facility

This page intentionally blank

3.0 Long-Term Surveillance Program

3.1 Site Inspections and Radiological Monitoring

3.1.1 Inspection/Monitoring Frequency

The City of Piqua, which leases the PNPF property, is responsible for on-going day-to-day surveillance of the physical nonnuclear aspects of the site. The City is required to promptly report to the DOE any condition which it has reason to believe is causing or may cause a radiological hazard to persons or property in, on or about the premises, and shall cooperate with the DOE in protecting all persons and property from any such hazards (Agreement 1968).

DOE is responsible for annual radiological monitoring at the facility. During the monitoring event, DOE representatives will also visually inspect the physical aspects of the PNPF to confirm site integrity and to determine the need, if any, for maintenance or additional monitoring. The site monitoring will be conducted once each calendar year. The date of the monitoring event may vary from year to year, but the DOE will endeavor to conduct the monitoring approximately once every 12 months unless circumstances warrant variance.

3.1.2 Inspection/Monitoring Procedure

Annual radiological surveys will be conducted as follows:

$ Area background readings will be established at locations outside of the PNPF.

$ General area gamma survey will be taken outside the PNPF.

$ General area gamma survey will be taken throughout the inside of the PNPF.

$ A smear/wipe survey of a representative portion of building surfaces (primarily floor surfaces) will be conducted.

$ Direct readings of smear surfaces will be taken at smear sample points.

$ A visual inspection of the structure shall be conducted to note the occurrence of changes that might affect the integrity of structures and components.

Survey locations will be as reported by Millennium Services, Inc., in the annual radiological survey report (Millennium 1997).

Survey locations and results will be depicted graphically on figures similar to those included in Section 2.4 of this document (Figures 2 through 7).

3.1.3 Inspection/Monitoring Personnel

The annual monitoring and inspection events will normally be performed by a team of two inspectors. Inspectors will be experienced in performing radiological surveys in accordance with accepted industry practices and standards. Ideally, at least one of the inspectors will have previously participated in an annual radiological survey of the PNPF site.

At least one of the inspectors will have formal health physics training. If particular problems develop at the site, more than two inspectors may be assigned to the inspection at DOE's discretion. Inspectors specialized in specific fields may be assigned to the inspection to evaluate serious or unusual problems and make appropriate recommendations.

3.2 Inspection/Monitoring Reports

The DOE will compile an annual monitoring and surveillance report. This report will discuss the results of the radiological monitoring and summarize the physical condition of the PNPF. This report will also discuss the need for follow-up inspections, monitoring, or maintenance actions, should any be necessary.

A copy of the annual report will be provided to the Director of Power Systems, Municipal Power System, City of Piqua.

3.3 Follow-Up Inspections

Follow-up inspections are unscheduled inspections that may be required (1) as a result of discoveries during a previous annual site inspection/monitoring event, or (2) as a result of changed site conditions reported by a citizen, employee, or federal, state, or local agency.

3.3.1 Criteria

The DOE will conduct follow-up inspections should the following occur.

1. A condition is identified during the annual site inspection, or other site visit, that requires personnel, perhaps personnel with specific expertise, to return to the site to evaluate the condition.

2. The DOE is notified by a citizen, employee, or federal, state, or local agency that conditions at the site are substantially changed.

Once a condition or concern is identified at the site, the DOE will evaluate the information, and, on the basis of this evaluation, will decide whether or not to respond with a follow-up inspection.

In the event of "unusual damage or disruption" that threatens or compromises site safety, security, or integrity, including the unlikelihood of an actual breach in containment materials, the DOE will begin the occurrence notification process (DOE Order 232.1), respond with an immediate follow-up inspection, and begin emergency measures (Section 3.4) to contain or

prevent dispersion of radioactive materials from the site. At any time, the DOE may request the assistance of local authorities or expertise to confirm the seriousness of a condition at the site before scheduling a follow-up inspection or initiating other appropriate action.

3.3.2 Personnel

Inspectors assigned to follow-up inspections will be selected on the same basis as for the annual site inspection/monitoring activities. (See Section 3.1.3.)

3.3.3 Reports of Follow-up Inspections

Results of routine follow-up inspections will be included in the next annual report (Section 3.2). Separate reports will not be prepared unless the DOE determines it advisable to notify an outside agency or stakeholder of a problem at the site.

If follow-up inspections are required for more serious or emergency reasons, the DOE will prepare a preliminary report of the follow-up inspection within 60 days.

3.4 Maintenance and Emergency Measures

3.4.1 Custodial Maintenance

Custodial maintenance for all nonnuclear aspects of the PNPF is the responsibility of the City of Piqua (Agreement 1968). Any necessary maintenance for the nuclear aspects of the PNPF is the responsibility of the DOE, although no such maintenance is anticipated.

3.4.2 Emergency Measures

Emergency measures are the actions the DOE will take in response to “unusual damage or disruption” that threaten or compromise site safety, security, or integrity. The DOE will contain or prevent dispersal of radioactive materials in the unlikely event of an actual breach in site containment materials.

3.5 Records

The LTSM Program maintains site records in a permanent site file at the DOE-GJO. These records are available for inspection by government agencies or the public.

All LTSM Program records are maintained in full compliance with DOE requirements:

1. DOE Order 1324.2A, Records Disposition
2. DOE Order 1324.5, Records Management Program
3. DOE Order 1324.8, Rights and Interests Records Protection Program
4. DOE Order 5500.7B, Emergency Operating Records

3.6 Quality Assurance

The long-term custody of the PNPF and all activities related to surveillance and maintenance of the site will comply with DOE Order 5700.6C, Quality Assurance (QA).

QA requirements will be transmitted through procurement documents to subcontractors when appropriate.

3.7 Health and Safety

Health and safety procedures for LTSM Program activities are consistent with DOE orders, regulations, codes, and standards.

Health and safety concerns specific to the PNPF are listed in an inspection checklist. Also in the Health and Safety section of the inspection checklist are 24-hour emergency telephone numbers for fire, hospital, ambulance, police, and sheriff; directions from the site to the nearest hospital with an emergency room are also included. The checklist is updated before each inspection to advise on-site personnel of new and continuing health and safety considerations. A Job Safety Analysis is prepared before each inspection and is presented as part of a prerequisite-inspection briefing held several days before the site visit. At the briefing, personnel who will be on the site review the Job Safety Analysis and are instructed on hazards that may be present at the site and health and safety procedures that must be followed.

Subcontractors that may be retained for certain tasks are advised of health and safety requirements through appropriate procurement documents. Subcontractors must submit health and safety plans for all actions subject to Occupational Safety and Health Administration (OSHA) requirements. Subcontractor health and safety plans will be reviewed and approved before the contract is awarded. Proposals from subcontractors without an adequate health and safety plan will be rejected.

4.0 References

Agreement, 1968. *Contract No. AT(11-1)-1798, Agreement between the United States of America acting through the United States Atomic Energy Commission and the City of Piqua, Ohio.* May 10, 1968.

Atomics International, 1968. *Piqua Nuclear Power Facility Retirements Safety Analysis Report,* AI-AEC-MEMO-12708, August 21, 1968.

Contract, 1959. *United States Atomic Energy Commission, Contract No. AT(11-1)-652, City of Piqua, Ohio.* June 1, 1959.

DOE (Department of Energy), 1993. *Environmental Restoration and Waste Management Site Specific Plan: Volume VII, Piqua Nuclear Power Facility,* DOE/CH-9225, January 1993.

Millennium Services, Inc. 1997. *Annual Radiological Survey of the Piqua Nuclear Power Facility,* May 1997.

This page intentionally blank

Appendix A

LEASE, LEGAL DESCRIPTION, AND OTHER DEED BOOK INFORMATION

62357

LEASE
BETWEEN
THE U. S. ATOMIC ENERGY COMMISSION
AND
CITY OF PIQUA, OHIO

This lease is entered into this 25th day of June, 1969, by and between the UNITED STATES OF AMERICA (hereinafter referred to as the "Government"), acting through the U. S. ATOMIC ENERGY COMMISSION (hereinafter referred to as the "Commission"), and the CITY OF PIQUA, OHIO (hereinafter referred to as the "City").

RECITALS

Under date of March 7, 1961, the City leased to the Commission a tract of land on which the Commission constructed a Government-owned nuclear reactor. The City operated that reactor under Contract No. AT(11-1)-652 with the Commission until the contract was terminated on December 13, 1967. The Commission and the City then entered into Contract No. AT(11-1)-1798 which defined the responsibilities of both in connection with the decontamination of the premises, entombment of the reactor, making the site safe and useable, and maintaining the continued safety of the site. Contract AT(11-1)-1798 provided that the City would convey title to the Government of that portion of the leased land on which the reactor building was erected and that the Government would thereafter lease the premises to the City. The City conveyed title to that parcel of land to the Government by deed recorded in the land records of Miami County, Ohio, on March 26, 1969. This lease is entered into in accordance with the provisions of Contract No. AT(11-1)-1798.

AGREEMENT

NOW THEREFORE, the parties hereto agree as follows:

1. In consideration of the commitments of the parties under Contract No. AT(11-1)-1798 and of the sum of $1.00 and other good and valuable considerations, the receipt and sufficiency of which are hereby acknowledged, the Commission does hereby lease to the City the following described parcel of land, together with the building erected thereon, situate in the west central part of Section 29, Town 1, Range 11, M.R.S. Springcreek Township, Miami County, State of Ohio, and being more particularly described as follows:

Beginning at a railroad spike at the northeast corner of tract number one, said spike being South ten degrees and thirty-nine minutes East (S 10° - 39' E) eighteen hundred and fifty-nine feet (1,859) of the corner of Sections 29, 30, 35, and 36 M.R.S.; thence South, eighty-one degrees eleven minutes West (S 81° - 11' W) two hundred thirteen and eighty-five hundredths (213.85') feet to a railroad spike; thence South, twelve degrees fifty-four minutes East (S 12° - 54' E) one hundred thirty-three (133.0) feet to an iron spike; thence North, sixty-three degrees thirty six minutes East (N 63° - 36' E) thirty seven (37.0) feet to place of beginning of the herein described parcel; thence continuing last said course, one hundred sixty-six (166.0) feet to a point; thence South, twenty-six degrees twenty-four minutes East (S 26° - 24' E) one hundred twenty (120.0) feet to a point; thence South, sixty-three degrees thirty-six minutes West (S 63° - 36' W) one hundred sixty-six (166.0) feet to a point; thence North, twenty-six degrees twenty-four minutes West (N 26° - 24' W) one hundred twenty (120.0) feet to the place of beginning.

Said parcel containing .457 Acres, more or less.

2. This lease shall commence on February 15, 1969 and shall continue until title to the land reverts to the City under the conditions specified in the deed from the City to the Government covering the above-described parcel of land. The City shall pay no rent for the above land.

3. The Government warrants that it has title in fee simple to the leased land and that it is free of liens and encumbrances. The Government further warrants that the City's possession and enjoyment of the leased land and building thereon shall be free and undisturbed except for those limitations stated herein and in Contract No. AT(11-1)-1798 between the Commission and the City, a copy of which is attached hereto as Appendix A.

4. The Government has sealed in place a radioactive source and irradiated materials, an inventory and description of which, together with the deed covering the herein identified land, has been recorded in the land records of Miami County, Ohio in Book 460 at pages 599 through 608.

5. The City shall not take nor shall it permit any one else to take any action which might impair or tend to impair the integrity of the sealed radioactive source.

6. In the event of any damage or injury to persons or property resulting from nuclear causes in connection with the presence of the sealed radioactive source on the property leased herein, the Government shall hold the City, its officers, agents and employees, harmless from any liability or claims therefor, except for any such damage or injury which may result from the failure of the City to fulfill any responsibilities or obligations assumed under this lease or under the aforesaid Contract No. AT(11-1)-1798.

7. The City shall hold the Government, its officers, agents and employees, harmless from any liability or claim arising out of damage or injury to persons or property resulting from non-nuclear causes in connection with the land and structures leased hereunder, except for such liability or claims which may result from a failure by the Government to fulfill any of the responsibilities or obligations assumed by it under this lease or the aforesaid Contract No. AT(11-1)-1798.

8. The City shall permit the Government, its representatives and contractors, free and ready access to the premises at any and all times for the purposes of carrying out any of the provisions of this lease or the aforesaid Contract No. AT(11-1)-1798.

9. The City warrants that no person or selling agency has been employed or retained to solicit or secure this lease upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the City for the purpose of securing business. For breach or violation of this warranty the Government shall have the right to annul this contract without liability or in its discretion to deduct from the contract price or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

10. No member of or delegate to Congress, or resident Commissioner, shall be admitted to any share or part of this contract, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

11. The City agrees that the Comptroller General of the United States or any of his duly authorized representatives shall until three years after the expiration or termination of this lease, or of the time periods for the particular records specified in Part 1-20 of the Federal Procurement Regulations (41 CFR Part 1-20), whichever expires earlier, have access to and the right to examine any directly pertinent books, documents, papers, and records of the City involving transactions related to this lease.

IN WITNESS WHEREOF, the parties hereto have hereunto subscribed their names as of the date first above written.

THE UNITED STATES OF AMERICA

BY: F. J. Walcavich

Chicago Operations Office
U. S. Atomic Energy Commission

State of Illinois, DuPage County, SS

I, Andrew J. Pryor, do hereby certify that F. J. Walcavich, personally known to me to be the person whose name is subscribed to the foregoing lease, appeared before me this day in person and acknowledged that he signed and delivered said lease on behalf of the United States of America as a free and voluntary act.

Given under my hand and seal this 25th day of June, 1969

Andrew J. Pryor
Notary Public

Witness:

Clint F. Tabbohall

Lucy D. Lang

THE CITY OF PIQUA, OHIO

By Robert M. Hance
Its City Manager & Purchasing Agent

State of Ohio, Miami County, SS

Robert M. Hance, being first duly sworn, declares and says that he is the City Manager and City Purchasing Agent for the City of Piqua, Ohio, a municipal corporation, that he executed and acknowledged the within lease on behalf of said city, and that the same is his free act and deed and the free act and deed of said corporation.

R K Wilson

This instrument was prepared By R. K. Wilson

I. LOCATION OF RADIOACTIVE MATERIALS AND OF DESCRIPTIVE DATA

Radioactive materials are located in a region called the "reactor complex" which is located below the main floor level within the reactor building. The materials became radioactive during the period of reactor plant operation ending in 1966. The region containing said materials extends outward in all directions a distance of 8 feet, more or less, from a point; said point being located 9.0 feet, south 65 degrees west from the geometric center of the reactor building, and 24.6 feet below the surface of the main floor. The intensity of radioactivity diminishes with time and at increasing distances from said point.

The locations of the radioactive materials, and of one of two sealed containers, or "time capsules," containing detailed information describing these materials and the related structures, are shown by Exhibit 1. The diagram identified as Exhibit 1. is a cross sectional view of the reactor looking easterly, made by a vertical plane oriented north 25 degrees west, and located 9.0 feet, south 65 degrees west from the geometric center of the reactor building. The intercept of the said line from the building center with the vertical plane is a point on the vertical centerline of the reactor and, that point on the floor surface has the reference elevation of 100.3 feet. One of the sealed containers previously mentioned is located at reference elevation 98.5 feet, and the center of the radioactive region has a reference elevation of 75.8 feet. The second sealed container is mounted on a wall 6 feet above the floor surface and 32.5 feet from the reactor center. It is located behind a metal plaque bearing the following inscription:

PIQUA NUCLEAR POWER FACILITY

-NOTICE-

Behind this plaque is a metal box containing detailed information concerning the reactor complex structure and contents. This box is not to be opened without the permission of the United States Government.

-United States Atomic Energy Commission-

-1969-

The above locations are more specifically described as follows:

Beginning at a railroad spike at the northeast corner of Tract No. 1, (the beginning point of the description of the land covered by this deed) said spike being south, ten degrees and thirty-nine minutes east (S 10°-39' E) eighteen hundred and fifty-nine feet (1859') of the corner of Sections 29, 30, 35 and 36 M.R.S.; thence south, eighty-one degrees eleven minutes west (S 81°-11' W) two hundred thirteen and eighty-five hundredths feet (213.85') to a railroad spike; thence south, twelve degrees fifty-four minutes east (S 12° -54' E) one hundred eighty-eight and seventeen hundredths feet (188.17') to a point, said point being in the intersection of the property line and center line of the reactor building; thence north, sixty-three degrees eight minutes twenty seconds east (N 63° -08' -20" E) ninety-two and thirty-seven hundredths feet (92.37') to the center of the sealed reactor vessel; thence, continuing said course thirty-two and fifty hundredths feet (32.50') to a point; thence above this point a sealed container, the second "time capsule" mentioned above, will be found mounted in the wall.

II. RADIOACTIVE SOURCE MATERIALS

The materials having the highest levels of radioactivity are located within the reactor vessel, hereinafter referred to as Region I. After a period of 80 years (2046 AD) more or less, the materials in Region I will have a radioactivity level of approximately 1000 times the level considered to be safe (by 1969 standards); however, it is predicted that the materials associated with the reactor vessel and biological shielding, Regions II and III, respectively, will have reached safe levels by that time.

The summaries of radioactive materials given on Exhibit 2 allow for decay periods of 25 to 100 years from the last date of reactor operation (January 1966). At the time of completion of the dismantlement program (January 1969) the levels of radioactivity from the radionuclides listed on Exhibit 2 are somewhat greater as given on Exhibit 2.1.

There are other radionuclides which are not significant after 25 or more years but which are significant sources at the present. These are the radionuclides having half lives of about one month to one year, which are listed on Exhibit 2.2. Exhibit 3 shows the ratio of radioactivity levels to safe levels (per 1969 standards) over a period of 140 years from 1966.

The radionuclide content left in the retired PNPF was compiled from the retirement safety analysis reports, AI-AEC-MEMO-12708* and the AI-AEC-MEMO-12708 Supplement A.* Safe levels of radioactivity are those levels which would allow unconditional release. The unconditional release criteria have been interpreted to mean the following:

1. External radiation hazards shall be deemed not to exist if the surface dose rate from every component is less than 0.2 mrem/hr.

2. Internal radiation hazards shall be deemed nonexistent if:

   a. Specific activity and solubility are such that the applicable nonoccupational MPC_W cannot be exceeded,

   b. The total activity, times the fraction deposited upon ingestion or inhalation, is less than a nonoccupational maximum permissible body burden, and

   c. The total amount of the element in the standard man were replaced by the element taken from the PNPF and would not result in a nonoccupational body burden. This is not applicable for elements such as europium for which the intestine or lung is the critical organ.

III. ACCESS TO REACTOR COMPLEX

The reactor complex region has been enclosed so as to preclude accidental entry or the transfer of radioactive materials to the outside. Unauthorized entry is forbidden by the United States Government. When entry to the reactor complex is authorized, access to one of the time capsules previously mentioned can be obtained by removing the concrete floor surface (about 4 inches thick) within a radius of 6 feet from the reactor centerline previously described, to expose the shield plug which weighs 11,000 pounds. After breaking the welds at the perimeter of the shield plug at a diameter of 11.8 feet, the shield plug can be lifted away exposing the region containing the "time capsule." The engineering drawings and other data contained therein describe the configuration of the installations in detail and include the basic data from which exhibits included in this appendix were compiled.

---

* Copies of these documents are in the two sealed containers described in Part I of this appendix.

A second sealed container containing duplicates of all documents in the "time capsule" is located on an inside wall of the reactor building, 23.3 feet, north 65 degrees east of the building center, at an elevation of 6 feet above the floor level.